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Running head: KNOWLEDGE-BASED INTERVENTION CERVICAL SCREENING

Assessing the Effectiveness of a Knowledge-Based Intervention to
Tackle Barriers to Cervical Screening: A Pilot Study

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Key Points

- Knowledge and fear may act as barriers to cervical screening
- Women (N = 402) received no information about screening, statistical information or barrier-tackling information
- Statistical and barrier-tackling information improved knowledge of how frequently women should be screened
- Barrier-tackling information reduced the false belief that screening tests for cancer
- Screening intention did not vary between the conditions

Keywords: cancer; oncology; cervical screening; barriers; knowledge; fear

Background

Many countries have routine cervical screening programmes. For example, the UK's call-recall programme invites women to be screened every 3-5 years, depending on their age. However, in the UK approximately 22% of women are not screened as often as recommended [1]. Knowledge may be a barrier to screening [2]. Indeed, women are unlikely to be screened if they have the false belief that screening is only necessary if they have symptoms [3] or that screening tests for cancer [4]. Moreover, although the UK's call-recall programme reminds women to attend screening, research suggests that women are unlikely to attend if they are unaware of how often they should be screened [4]. Therefore, it is important to develop interventions that tackle these knowledge-barriers.

The fear of a positive result is also likely to predict screening. However, some evidence suggests fear deters screening [5], whilst other research suggests it promotes screening [4]. Fear is likely to promote health behaviours when this behaviour is viewed as an effective strategy for overcoming a threat [6]. Indeed, research has suggested that fear may promote screening when it is thought to put one's mind at ease [7]. Therefore, interventions also need to promote beneficial responses to fear.

Given that women are likely to be screened when they are knowledgeable about screening and believe that it is a beneficial response to fear, researchers have argued that interventions should aim to tackle these barriers in order to improve screening attendance [4]. However, there are a lack of empirically supported interventions that tackle these barriers. Therefore, this pilot study tested whether an intervention that targets the knowledge-barriers and promotes beneficial responses to fear improves screening intention.

Methods

Design

This online study used an experimental between-participants design. As such, participants were randomly allocated into one of the three conditions: pure control, information control or barrier-tackling condition. The dependent variables were cervical screening intentions, the knowledge-barriers and fear.

Participants

Between February-April 2016, participants were recruited using adverts distributed via email, social media, and online forums. To take part, participants had to be eligible for the NHS cervical screening programme (i.e., female, aged 25-64 years and live in the UK). Participants were ineligible if they were pregnant or had received a total hysterectomy. There were 402 eligible women who completed the study ($M_{age} = 38.11$, $SD_{age} 9.75$; for full details, see Supporting Information).

Materials and Procedure

To obtain an overview of the sample participants first completed demographic (e.g., ethnicity, marital status) and health measures (e.g., screening and cancer history; see Supporting Information). Participants were then allocated into a condition. The pure control condition did not receive any information about cervical screening. The information control received information stating the number of women who are diagnosed with and die from cervical cancer, the importance of detecting abnormal cells early and the effectiveness of the cervical screening programme. This control condition was included to ensure that positive effects in the barrier-tackling condition were not due to receiving information. The barrier-tackling condition received this information plus information designed to tackle the barriers to cervical screening [4]. This information stated the frequency that women should be

screened, and that screening is not checking for cancer, important without symptoms and may put women's mind at ease if they are worried.

Next, a four-item screening intention measure was completed (e.g., 'Next time I am invited to a cervical screening test I am likely to attend'; 1 = *strongly disagree*, 6 = *strongly agree*; $\alpha = .93$)¹. Participants then completed a series of two item measures (1 = *strongly disagree*, 5 = *strongly agree*). These measures assessed the knowledge of screening frequency (e.g., 'Women aged 25-49 should attend cervical screening tests every 3 years'; $r = .63, p < .001$), fear (e.g., 'I am worried about the results of a cervical screening test'; $r = .86, p < .001$), and the beliefs that screening tests for cancer (e.g., 'Cervical screening tests are for checking cancer'; $r = .66, p < .001$) and is unnecessary without symptoms (e.g., 'Cervical screening is unnecessary if you do not have symptoms'; $r = .70, p < .001$).

Statistical Methods

Using IBM SPSS (version 22), a series of AVOVAs tested whether condition had a significant effect on screening intention, the barriers and fear.

Results

Inverse transformations were performed on the knowledge of screening frequency and symptoms variables prior to data analysis to correct for outliers. The intervention had a significant effect on knowledge of screening frequency (Table 1). Post-hoc Tukey tests revealed this was due to greater knowledge in the barrier-tackling than pure control condition. The intervention also had a significant effect on the false belief that screening tests for cancer, due to this belief being lower in the barrier-tackling than the pure or information control conditions. By contrast, the intervention did not have a significant effect on the false belief that screening was unnecessary without symptoms, fear or screening intention.

Discussion

The barrier-tackling intervention improved knowledge of how often women should be screened and reduced the false belief that screening tests for cancer. As such, the intervention tackled some of the barriers to screening. However, the intervention did not have a significant effect on screening intention. This suggests the intervention may be more effective in tackling some of the barriers to screening than increasing screening intentions. Despite this, the fact that the intervention improved women's knowledge of screening suggests it helped them to make a more informed decision.

Clinical Implications

This pilot study demonstrated an effective intervention to tackle some of the barriers to screening. However, further research is needed to test effective strategies for tackling the barriers to screening that were not influenced by the intervention, such as the belief that screening is unnecessary without symptoms. Therefore, we argue that further research is needed to develop this cervical screening campaign.

Study Limitations

It is worth considering the limitations of this research. First, this study assessed screening intentions. Given the gap between intention and behaviour [8], it is important to assess screening behaviour. Second, there are other barriers to screening that were not included in this intervention, such as embarrassment, practical concerns and worries about the procedure [5]. Third, the sample may not have been representative. Although the percentage of women who were not up-to-date with screening in this sample (27%) was similar to that of the population (26%) [1], there were a low number of women from ethnic minority backgrounds. Therefore, future research is needed to replicate these findings using behavioural data and a more representative sample.

Conclusions

The intervention improved women's knowledge on how frequently they should be tested and tackled the false belief that screening tests for cancer. However, this intervention did not have a direct effect on cervical screening intentions. Future research is needed to determine strategies for tackling the other barriers to screening and whether such interventions can promote cervical screening behaviour.

Footnotes

¹ The scale responses were strongly disagree, disagree, somewhat disagree, neither agree nor disagree, agree and strongly agree. Unfortunately, due to a technical error 'somewhat agree' was not presented to participants. However, this was consistent across participants and thus unlikely to bias the results.

Conflict of Interest

Authors declare no conflict of interests.

Ethical Approval

Ethical approval was granted from the authors' institutional review board (reference number: SUB049_Shepherd_210116).

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Table

Table 1. The effect of the intervention on the knowledge barriers, fear and screening intention.

	Pure control	Information control	Barrier-tackling	F-value
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	
Knowledge of screening frequency [†]	0.66(0.29) ^a	0.72(0.28) ^{ab}	0.74(0.28) ^b	$F(2, 399) = 3.26, p = .039, \eta_p^2 = .02$
Screening checks for cancer	3.69(1.08) ^a	3.75(0.93) ^a	2.64(1.24) ^b	$F(2, 399) = 44.71, p < .001, \eta_p^2 = .18$
Screening unnecessary without symptoms [†]	1.13(0.23) ^a	1.15(0.24) ^a	1.15(0.24) ^a	$F(2, 399) = 0.41, p = .664, \eta_p^2 < .01$
Fear of a positive result	3.11(1.27) ^a	3.13(1.13) ^a	2.96(1.12) ^a	$F(2, 399) = 0.78, p = .460, \eta_p^2 < .01$
Cervical screening intention	5.15(1.30) ^a	5.16(1.28) ^a	5.14(1.36) ^a	$F(2, 398) = 0.01, p = .993, \eta_p^2 < .01$

Note. [†] = This variable is transformed, hence to low mean.

Different subscript represent significant difference between the means at $p < .05$.